



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200
Fax 613 632-5246



D212-664-201TRN
Job Sheet 195374



Part No: D212-664-201TRN

Job Qty: 1 pcs

Part Name: Crosstube Turning Detail



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 5/21/19

Job Tracking No:

Due Date: 6/21/19

Created By: Jennifer Renwick

Type: Stock

Description:

Note: D212-664-241 REV E IPP Rev:A 08-03-06 new issue DD verified by:ec IPP Rev B 08.04.02 Removed polish
EC verified DD

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Lead Time	DAS Sign-off
					Setup Hrs	Run Hrs	Workcenter / Supplier			
100	Mori Seiki TL-40 - 1	1 pcs	6/21/19	6/21/19	0.00	1.33	Mori Seiki TL-40 - 1			662019-07-30
110	QC 2	1 pcs	6/21/19	6/21/19	0.00	0.00	QC 2 - 1			9-89
							QC 2 - 12			
							QC 2 - 14			
							QC 2 - 17			
							QC 2 - 19			
							QC 2 - 2			
							QC 2 - 20			
							QC 2 - 22			
							QC 2 - 23			
							QC 2 - 25			
							QC 2 - 32			
							QC 2 - 33			
							QC 2 - 35			
							QC 2 - 39			
							QC 2 - 4			
							QC 2 - 40			
							QC 2 - 44			
							QC 2 - 45			
							QC 2 - 48			
							QC 2 - 49			
							QC 2 - 50			
							QC 2 - 51			
							QC 2 - 52			
							QC 2 - 57			
							QC 2 - 62			
							QC 2 - 63			
							QC 2 - 8			DAS
							QC 2 - 66			662019-07-30
							QC 2 - 64			9-89
							QC 2 - 65			
							QC 2 - 5			
							QC 2 - 71			DAS
120	Mori Seiki TL-40 - 1 - B4B	1 pcs	6/21/19	6/21/19	0.00	1.33	Mori Seiki TL-40 - 1 - B4B			662019-07-31
130	QC 2	1 pcs	6/21/19	6/21/19	0.00	0.00	QC 2 - 1			9-89
							QC 2 - 12			
							QC 2 - 14			
							QC 2 - 17			
							QC 2 - 19			
							QC 2 - 2			
							QC 2 - 20			

Plex 5/21/19 10:32 AM Dart.Renwick.Jennife

				QC 2 - 22	
				QC 2 - 23	
				QC 2 - 25	
				QC 2 - 32	
				QC 2 - 33	
				QC 2 - 35	
				QC 2 - 39	
				QC 2 - 4	
				QC 2 - 40	
				QC 2 - 44	
				QC 2 - 45	
				QC 2 - 48	
				QC 2 - 49	
				QC 2 - 50	
				QC 2 - 51	
				QC 2 - 52	
				QC 2 - 57	
				QC 2 - 62	
				QC 2 - 63	
				QC 2 - 8	DAS
				QC 2 - 66	662019-07-31
				QC 2 - 64	9-89
				QC 2 - 65	
				QC 2 - 5	
				QC 2 - 71	
140	QC 8	1 pcs	6/21/19	0.00 0.00	QC 8 - 12
					QC 8 - 14
					QC 8 - 17
					QC 8 - 20
					QC 8 - 25
					QC 8 - 3
					QC 8 - 32
					QC 8 - 33
					QC 8 - 35
					QC 8 - 39
					QC 8 - 4
					QC 8 - 44
					QC 8 - 45
					QC 8 - 49
					QC 8 - 58
					QC 8 - 8
					QC 8 - 9
					QC 8 - 68
					QC 8 - 67
					QC 8 - 1 (A)
					QC 8 - 47
					QC 8 - 40
					QC 8 - 52
					QC 8 - 23
145	Crosstubes - 2 - B4B	1 pcs	6/21/19	0.00 0.25	Crosstubes - 1 - B4B
					Crosstubes - 2 - B4B
					Crosstubes - 3 - B4B
					Crosstubes - 4 - B4B
150	Crosstubes - Bend - 2 - B4B	1 pcs	6/21/19	0.00 0.25	Crosstubes - Bend - B4B
160	QC 7	1 pcs	6/21/19	0.00 0.00	QC 7 - 10
					QC 7 - 13
					QC 7 - 14
					QC 7 - 15
					QC 7 - 17
					QC 7 - 18
					QC 7 - 19
					QC 7 - 2
					QC 7 - 28
					QC 7 - 3
					QC 7 - 30
					QC 7 - 34
					QC 7 - 36
					QC 7 - 37
					QC 7 - 41
					QC 7 - 47

				QC 7 - 48	
				QC 7 - 51	
				QC 7 - 58	
				QC 7 - 59	
				QC 7 - 60	
				QC 7 - 9	
				QC 7 - 68	
				QC 7 - 50	DAS
				QC 7 - 67	67 19-08-07
				QC 7 - 40	9-89
				QC 7 - 24	
				QC 7 - 43	
170	Packaging 3-1 - Stock - B4B	1 pcs	6/21/19	0.00 0.00	Packaging 3 - 1 - B4B
					Packaging 3 - 2 - B4B
					Packaging 3 - 3 - B4B
					Packaging 3 - 4 - B4B
					Packaging 3 - 5 - B4B
					Packaging 3 - 6 - B4B
					Packaging 3 - 7 - B4B
					Packaging 3 - 8 - B4B
					Packaging 3 - 9 - B4B
					Packaging 3 - 10 - B4B
					Packaging 3 - 11 - B4B
					Packaging 3 - 12 - B4B
					Packaging 3 - 13 - B4B
					Packaging 3 - 14 - B4B
					Packaging 3 - 15 - B4B
					Packaging 3 - 16 - B4B
					Packaging 3 - 17 - B4B
					Packaging 3 - 18 - B4B
					Packaging 3 - 19 - B4B
					Packaging 3 - 20 - B4B
					Packaging 3 - 21 - B4B
					Packaging 3 - 22 - B4B
					Packaging 3 - 23 - B4B
					Packaging 3 - 24 - B4B
					Packaging 3 - 25 - B4B
					Packaging 3 - 26 - B4B
					Packaging 3 - 27 - B4B
					Packaging 3 - 28 - B4B
					Packaging 3 - 29 - B4B
					Packaging 3 - 30 - B4B
					Packaging 3 - 31 - B4B
					Packaging 3 - 32 - B4B
					Packaging 3 - 33 - B4B
					Packaging 3 - 34 - B4B
					Packaging 3 - 35 - B4B
					Packaging 3 - 36 - B4B
180	QC 21 - SA	1 pcs	6/21/19	0.00 0.00	QC 21 - SA - 21
					QC 21 - SA - 70
					QC 21 - SA - 53

Part Op 100 - Mori Seiki TL-40 (Mori Seiki CNC Lathe Large) 1-Fill tube with sand & install plugs DT8534 on both ends as per Descriptions: Folio FA114 2-Turn first side as per Folio FA114

110 - (QC2- Inspect parts off machine FAI/FAIB)

120 - Mori Seiki TL-40 (Mori Seiki CNC Lathe Large) 1-Turn second side as per Folio FA114

130 - (QC2- Inspect parts off machine FAI/FAIB)

140 - (QC8- Inspect parts - second check)

145 - (Crosstubes) GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.

150 - Crosstubes) 1- handfinish X-TUBE INSIDE AND OUT

160 - (QC7-Inspect Chemical Conversion Coat)

170 - (Identify as per dwg & Stock Location: _____) Identify and stock in kanban rack Location: _____

180 - (QC21- Final Inspection - Work Order Release)

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
D6006-129	Crosstube Material	1 pcs (1 ea)	100-Mori Seiki TL-40 - 1	F123967

Job Allocations

Operation	Component Part	Required	Inventory	Allocated
100-Mori Seiki TL-40 - 1	D6006-129	1	53	0

Part Specifications

Specifications could not be found.

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**Container No: S201592****Part: D212-664-201TRN****Job No: 195374****Serial No/Batch: S201592****Revision: E****Inspector:****Exp Date:****Instructions:**

Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
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TEL.: 1 813 632-5200
Email: sales@dartaero.com
www.dartaerospace.com

Date: 07/30/19

②

DART AEROSPACE LTD	Work Order: 195374
Description: Crosstube Assembly (205/212 High Aft)	Part Number: D212-664-241
Inspection Dwg: D212-664-241 Rev: E	Page 1 of 2

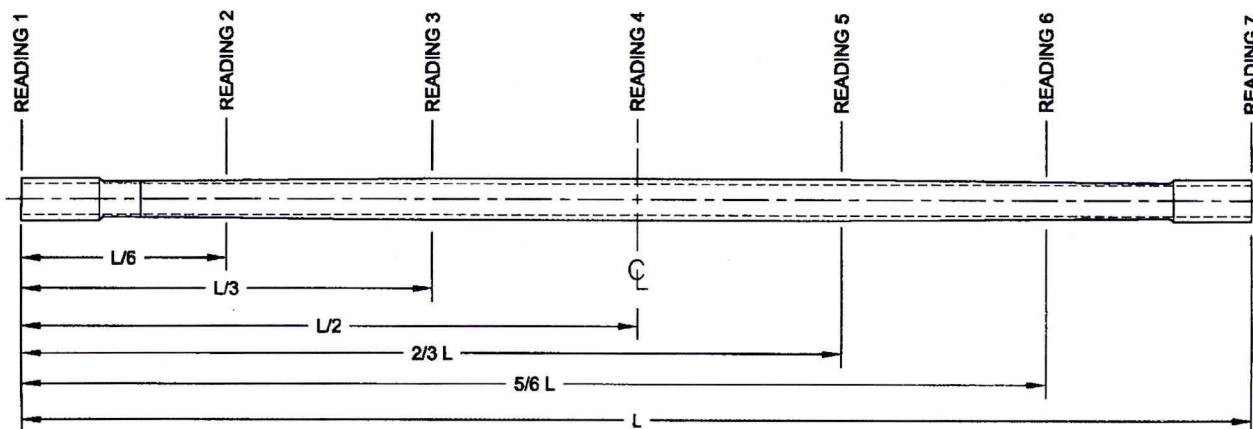
FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.200	+/-0.010	207	✓	CNC-08	
	R0.063	+/-0.010	063	✓	RG	
	2.990	+0.005/-0.000	2.995	✓	CNC-04	
	5.237	+/-0.030	5.243	✓	CNC-08	
	2.600	+0.005/-0.000	2.605	✓	CNC-04	
	2.686	+0.005/-0.000	2.691	✓	↓	
	2.770	+0.005/-0.000	2.775	✓		
	2.854	+0.005/-0.000	2.859	✓		
	2.938	+0.005/-0.000	2.943	✓		
	3.021	+0.005/-0.000	3.025	✓	CNC-05	
	3.133	+0.005/-0.000	3.138	✓	"	
	3.179	+0.005/-0.000	3.184	✓	"	
SIDE B	0.200	+/-0.010	208	✓	CNC-08	
	R0.063	+/-0.010	063	✓	RG	
	2.990	+0.005/-0.000	2.994	✓	CNC-04	
	5.237	+/-0.030	5.232	✓	CNC-08	
	2.600	+0.005/-0.000	2.605	✓	CNC-04	
	2.686	+0.005/-0.000	2.691	✓	↓	
	2.770	+0.005/-0.000	2.775	✓		
	2.854	+0.005/-0.000	2.859	✓		
	2.938	+0.005/-0.000	2.943	✓		
	3.021	+0.005/-0.000	3.025	✓	CNC-05	
	3.133	+0.005/-0.000	3.138	✓	"	
	3.179	+0.005/-0.000	3.184	✓	"	
	124.362	+/-0.020	124.36	✓	Tape	

2

DART AEROSPACE LTD	Work Order: 195374
Description: Crosstube Assembly (205/212 High Aft)	Part Number: D212-664-241
Inspection Dwg: D212-664-241 Rev: E	Page 2 of 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	416	388	380	418	.038	0.062"
READING 2 L= 20.73	311	309	316	320	.011	
READING 3 L= 41.45	486	476	486	499	.023	
READING 4 L= 62.18	532	526	529	531	.006	
READING 5 L= 82.91	493	478	478	496	.018	
READING 6 L= 103.64	323	296	304	330	.034	
READING 7 L= 124.36	391	401	404	393	.013	

Dwg

6.515

Calibration Result

Actual Block Thickness: 200-500

Sitiescan 250 Measured Thickness: 200-500

Measured by: DAS 66
9-89
Date: 2019-07-31

Audited by: [Signature]
Date: 19-07-31

Preliminary Approval:
Date:

Rev	Date	Change	Revised by	Approved
A	05.04.27	New Issue (P/O D412-664-201)	KJ/JLM	
B	06.03.09	Tolerance for 5.237 was +/-0.001	KJ/JLM	
C	07.05.08	Dwg Rev. updated	KJ/JLM	
D	10.08.03	Dimension 124.362 was 124.36	KJ	
E	12.06.04	Wall thickness form added	KJ	
F	15.03.03	Dwg Rev updated	KJ	[Signature]

Item	Qty -241	Qty -241B	Part Number	Description
1	X		D212-664-241	CROSSTUBE ASSEMBLY (205/212 HIGH AFT)
2		X	D212-664-241B	CROSSTUBE ASSEMBLY (214 HIGH AFT)
3	1	1	D6006-129	CROSSTUBE
4	2		D2940-1	SUPPORT
5	4	4	D3595-063-530	RUBBER CUSHION
6		2	D5018-1	SUPPORT
7	4	4	MS21920-28	CLAMP (OR MS21920-30)
8	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6006-129
FINISHED LENGTH = 124.362±0.020
- 2) FINISH: a) CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
b) PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
c) MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2 / C6-3, HATCHED AREA)
d) PAINT OUTSIDE PER DART QSI 005 4.2
e) REMOVE MASKING AND APPLY MATTE CLEAR COAT
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-241/-241B = 44.2 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

MACHINING

- 10) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 5 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7.2% (BASED ON O.D.) IN LOWER HALF OF R35.5 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- 12) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.

ASSEMBLY

- 13) INSTALL D2940-1 / D5018-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 14) INSTALL MS21920-28 CLAMPS (OR -30) WITH D3595-063-530 RUBBER CUSHIONS TO SECURE THE SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSSTUBE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

RELEASED
2014-05-26
ND

E	D5018-1 WAS D2940-1 (-241B), PROSEAL WAS MAGNOBOND, NOTE 2: ADD INSPECTION WINDOW, NOTE 11: ALLOW 7.2% CRUSH, NOTE 15: ADD 72HR CURE AND RETORQUE FOR PROSEAL, ADD SHEET 3, CLAMPS REVERSED TO PREVENT CHAFING (ZN B7-2, B7-3), BEND HEIGHT TOL. NOW 0.25 WAS 0.13 (C1-4), INCORP DEO D-1/-2	CP	14.04.01
D	REFORMAT/REVISE GENERAL NOTES/PART LIST: REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -241B (ZN D4-2, B4-2); REMOVED REF & ADD TOLERANCES (ZN D8-3 & C4-3, C6-3 & A8-3); RELOCATED FLAG #6 PER PAR 08-048 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -1009 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	CP	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN	Q	DART AEROSPACE LTD	
DRAWN	Q	HAWKESBURY, ONTARIO, CANADA	
CHECKED	DW	DRAWING NO.	REV. E
MFG. APPR.	JM	D212-664-241	SHEET 1 OF 5
APPROVED	JM	TITLE	SCALE
DE APPR.	JM	CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
DATE	14.04.01	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

8 7 6 5 4 3 2 1

13 14 15
D2940-1 SUPPORT
MS21920-28 CLAMP, 2X
D3595-063-530 RUBBER CUSHION, 2X
2 PL

14.00

D212-664-601
BENT TUBE

MASK AREA PRIOR TO PAINTING,
REMOVE MASKING AFTER PAINT
AND APPLY CLEAR COAT

2.0

SYM

**D212-664-241
ASSEMBLY DETAIL**

E MS21920-28
CLAMP, REF
14 15

E 13
APPLY PROSEAL
BETWEEN D2940-1 AND
CROSSTUBE

D2940-1
SUPPORT,
REF

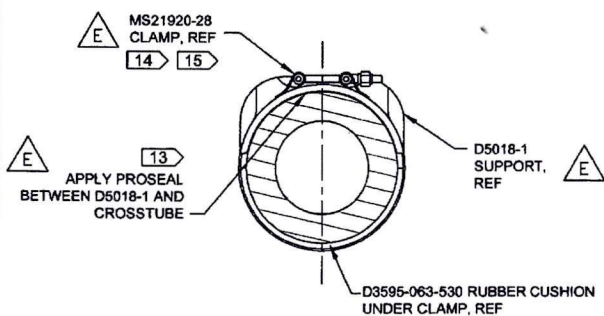
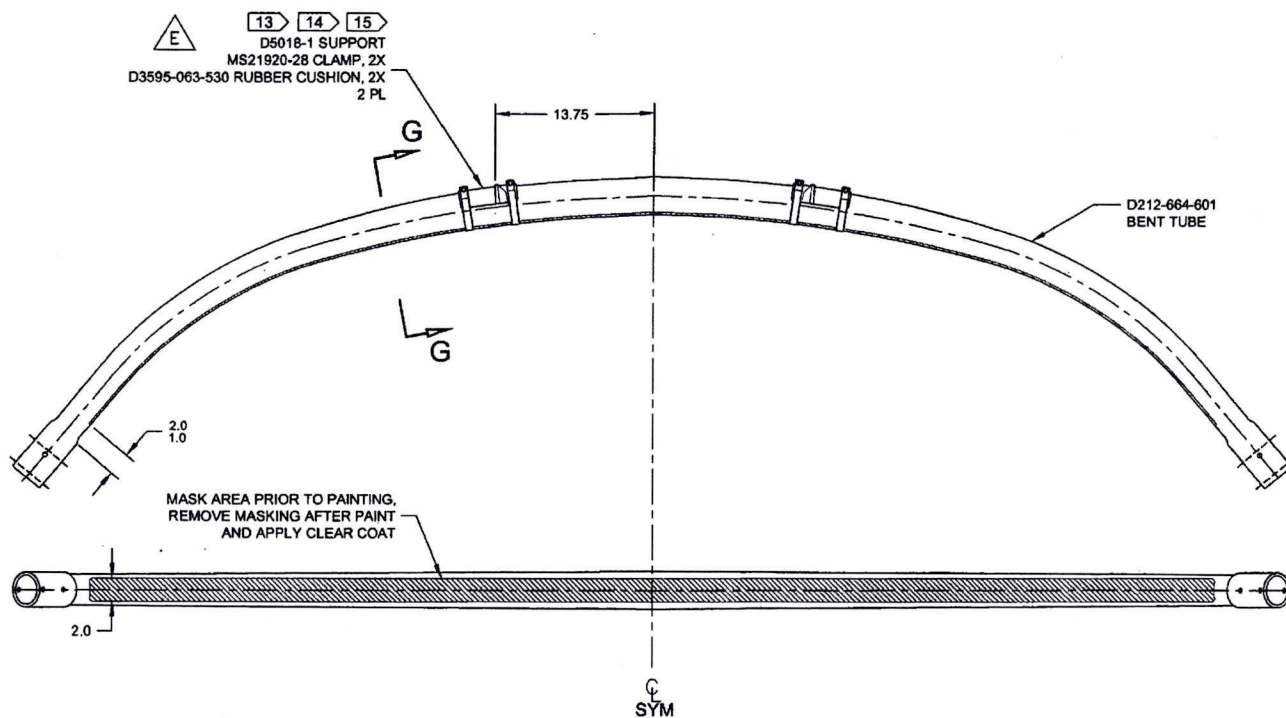
D3595-063-530 RUBBER CUSHION
UNDER CLAMP, REF

**SECTION A-A
SCALE 4X**

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2014-05-26

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DRAWN	90	HAWKESBURY, ONTARIO, CANADA	
CHECKED	DL	DRAWING NO.	REV. E
MFG. APPR.	W	D212-664-241	SHEET 2 OF 5
APPROVED	W	TITLE	SCALE
DE APPR.	W	CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
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8 7 6 5 4 3 2 1

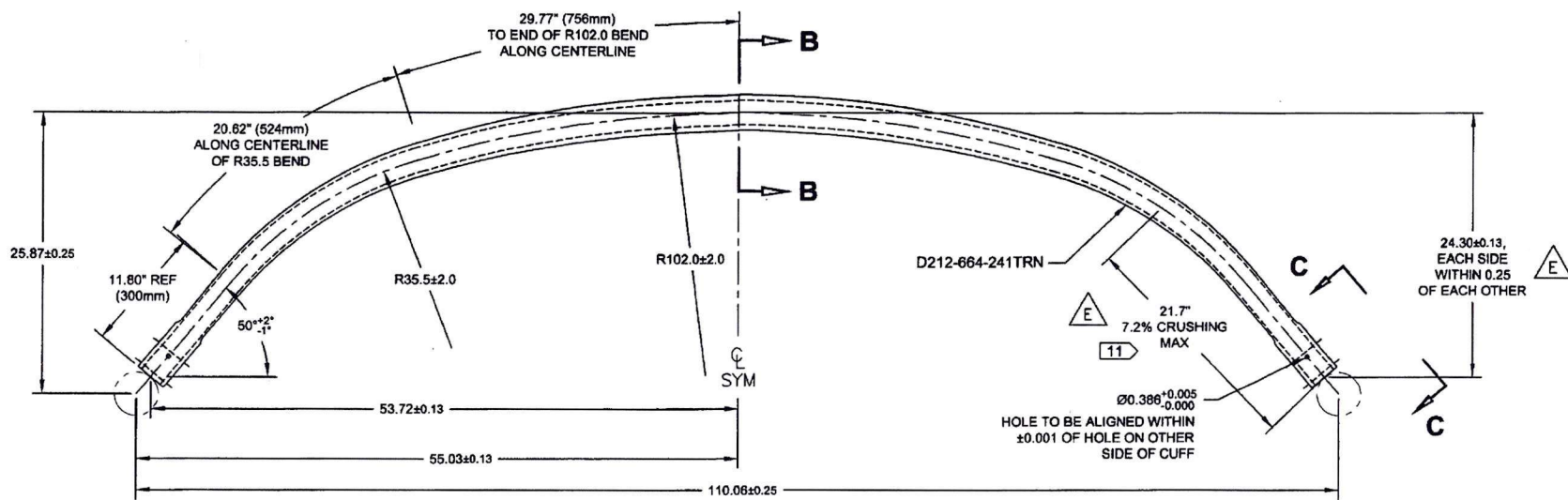


SECTION G-G
SCALE 4X

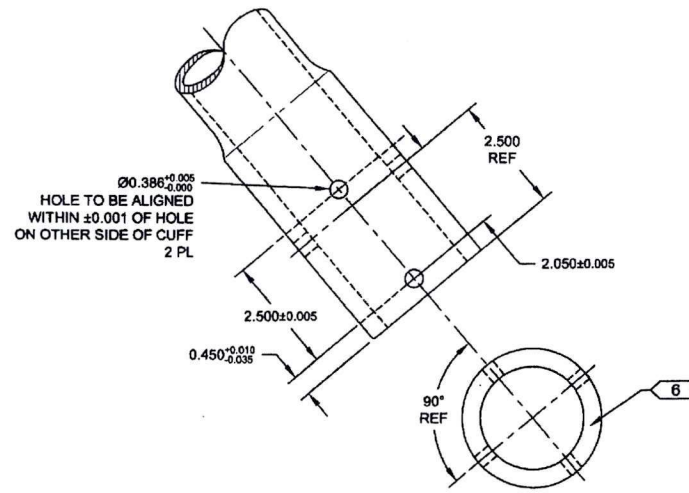
D212-664-241B
ASSEMBLY DETAIL

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2014-05-26

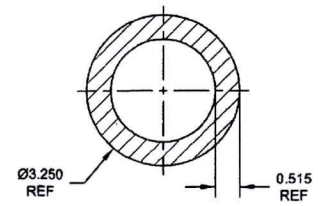
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DRAWN		HAWKESBURY, ONTARIO, CANADA
CHECKED		DRAWING NO. REV. E
MFG. APPR.		D212-664-241 SHEET 3 OF 5
APPROVED		TITLE SCALE
DE APPR.		CROSSTUBE ASSY (205/212 HI AFT) NTS
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D212-664-601 11
BENDING AND DRILLING DETAIL



VIEW C-C: CUFF DETAIL
 SCALE 3X



SECTION B-B
 SCALE 4X

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 2014-05-26
WJD

DESIGN	<i>JP</i>	DART AEROSPACE LTD	
DRAWN	<i>JP</i>	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>DL</i>	DRAWING NO.	REV. E
MFG. APPR.	<i>DL</i>	D212-664-241	SHEET 4 OF 5
APPROVED	<i>JP</i>	TITLE	SCALE
DE APPR.	<i>JP</i>	CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
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R100.0 TRANSITION
BETWEEN TAPERED
SECTIONS

R100.0 TRANSITION
BETWEEN TAPERED
SECTIONS

0.515 WALL
STOCK, REF

SEE DETAIL D

0.000
2.600^{+0.005}_{-0.000}

11.795^{+0.030}
2.686^{+0.005}_{-0.000}

16.950^{+0.030}
2.770^{+0.005}_{-0.000}

22.105^{+0.030}
2.854^{+0.005}_{-0.000}

27.260^{+0.030}
2.938^{+0.005}_{-0.000}

32.415^{+0.030}
3.021^{+0.005}_{-0.000}

37.284^{+0.030}
3.133^{+0.005}_{-0.000}

42.114^{+0.030}
3.179^{+0.005}_{-0.000}

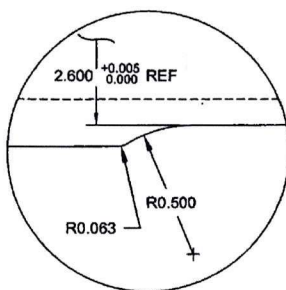
62.181 REF

SEE DETAIL E

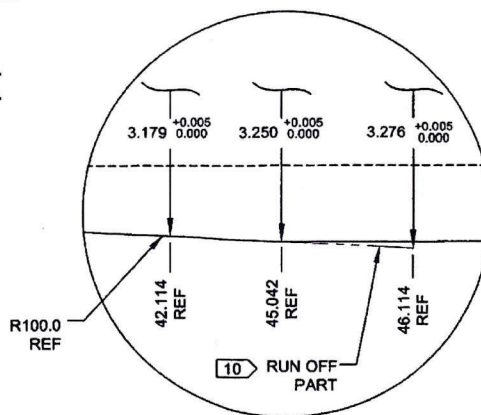
TAPER UNIFORMLY FROM
THROUGH TO 3.276^{+0.005}_{-0.000}
RUNNING OFF PART

10 3.179^{+0.005}_{-0.000}

D212-664-241TRN
TURNING DETAIL



DETAIL F:
CUFF TRANSITION
SCALE 10X



DETAIL E:
TAPER RUN-OFF
NOT TO SCALE

10 30° X 0.500 DEEP
CHAMFER

0.200

R0.063

0.000

2.990^{+0.005}_{-0.000}

5.237^{+0.030}
5.675^{+0.030}

2.600 REF

5.300 REF

SEE DETAIL F

DETAIL D:
CROSSTUBE CUFF
SCALE 5X

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2014-05-26

DESIGN		DART AEROSPACE LTD
DRAWN		HAWKESBURY, ONTARIO, CANADA
CHECKED		DRAWING NO. REV. E
MFG. APPR.		D212-664-241 SHEET 5 OF 5
APPROVED		TITLE SCALE
DE APPR.		CROSSTUBE ASS'Y (205/212 HI AFT) NTS
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